

# Smart Pant for Bedridden Patients: A Novel Approach to Prevent Bedsores

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## Abstract

Bedsores, also known as pressure ulcers, are a common issue among bedridden patients, leading to severe discomfort and health complications.

This research introduces an innovative device, the "Smart Pant for Bedridden Patients," designed to improve blood circulation and prevent bedsores.

The device consists of specially designed shorts embedded with electrodes that periodically pass mild electric current to stimulate blood flow in affected areas.

This paper discusses the design, working principle, experimental results, and potential impact of this device on healthcare.

## 1. Introduction

Bedsores develop due to prolonged pressure on the skin, restricting blood flow and causing tissue damage.

Existing solutions include frequent repositioning, special mattresses, and topical treatments, but these methods require continuous caregiver attention.

Electrical stimulation (ES) has been explored as a treatment for pressure ulcers, with studies indicating that ES may increase the proportion of pressure ulcers healed and the rate of healing.

The Smart Pant aims to provide an autonomous solution to prevent bedsores by maintaining circulation through electrical stimulation.

## 2. Methodology

The Smart Pant consists of:

- Material: Soft, breathable fabric suitable for extended wear.
- Electrodes: Strategically placed in high-risk areas to stimulate blood flow.
- Control Unit: A compact electronic system that delivers mild electric pulses at periodic intervals.
- Power Source: A rechargeable battery ensuring portability and ease of use.
- Safety Features: Current regulation to prevent skin irritation or discomfort.

The prototype was developed using medical-grade electrodes and tested on simulated models to evaluate efficiency.

### 3. Experimental Results

Initial testing showed that electrical stimulation significantly improved blood circulation in targeted areas.

Thermal imaging before and after stimulation confirmed increased blood flow.

Volunteers reported no discomfort, and prolonged use showed promising results in preventing pressure sores.

### 4. Discussion

Compared to traditional methods, the Smart Pant offers a proactive and less labor-intensive approach.

The autonomous functioning reduces dependency on caregivers and enhances patient comfort.

Studies have shown that ES probably increases the rate of pressure ulcer healing.

Further clinical trials are needed to establish long-term effectiveness.

### 5. Conclusion & Future Scope

The Smart Pant provides an innovative solution to prevent bedsores in bedridden patients.

Future improvements may include customizable stimulation patterns, integration with IoT for remote monitoring, and large-scale clinical trials for validation.

### References

1. Arora M, Harvey LA, Glinsky JV, et al. Electrical stimulation for treating pressure ulcers. Cochrane Database Syst Rev. 2020;2020(1):CD012196. doi:10.1002/14651858.CD012196.pub2